Unit assessment test

1. Draw a diagram to show the five main stages of the software development life cycle. [5]

2. (a) What is meant by prototyping? [2]

   (b) Name a software development method which uses prototyping. [1]

   (b) One type of software prototype is a **throwaway** prototype.
   Explain why a software developer might choose to build a throwaway prototype. [2]

   (c) Name **two** items that may be included in a software prototype. [2]

3. Describe **two** types of testing that may be carried out as part of the systems development process. [4]

4. The binary search algorithm below processes an array called **names**. The names in **names** are stored in ascending alphabetical order and **student**, **low, high**, **guess** are all integer variables. The function **int** returns the integer part of its parameter.
The array index starts at 0.

```
found = False
low = 0
high = len(names) - 1

while found == False and high >= low
    guess = int((low + high)/2)
    if names(guess) = student then
        found = True
    else
        IF names(guess) > student THEN
            high = guess - 1
        else
            low = guess + 1
endwhile
if found = True then
    print ("student found in position ", guess)
else
    print ("student not in list")
endif
```

(a) Complete the following trace table when **student = "Olive"** using the array:

names = ["Anna", "Bob", "David", "Henry", "Joe", "Lila",
"Nick", "Olive", "Paul", "Sue", "Tom"] [4]

low	high	guess	names(guess)	found

(b) What will be output if the user searches for "Ian"? [1]

5. (a) What is an *algorithm*? [1]

(b) List **four** properties of a good algorithm. [4]

6. (a) What is a programming paradigm? [1]

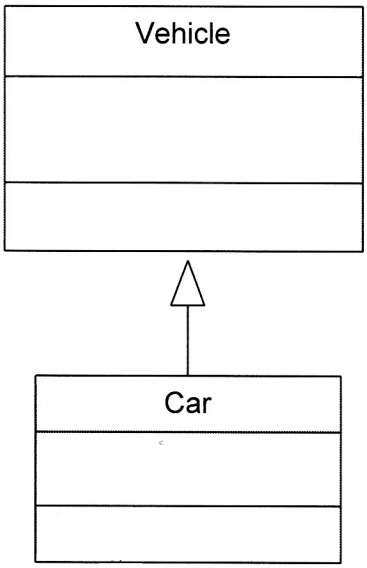
(b) Prolog is an example of a declarative programming language.

Describe briefly **three** features of a declarative programming language which distinguish it from a procedural language. [6]

(c) State, with a reason, an application for which a declarative language such as Prolog is a suitable language. [2]

7. State **two** advantages of the object-oriented approach over the structured approach to program design. [2]

8. An incomplete inheritance diagram for a system which holds and processes details of vehicles registered in the UK is shown below.



(a) Show on the diagram where the classes Lorry and Motorbike should be added. [1]

(b) State the reason you positioned them as you did. [1]

(c) The registration numbers need to be stored.

State which class should store the registration number and give a reason for your answer. [2]

(d) Explain the following terms:

(i) Polymorphism [2]

(ii) Encapsulation [2]

9. An assembly language program is written using the Little Man Computer (LMC) instruction set.

```
        LDA ZERO
        STA RES
        INP
        BRZ NEXT
LOOP    ADD RES
        STA RES
        INP
        BRZ NEXT
        BRA LOOP
NEXT    LDA RES
        OUT
        HLT
RES     DAT
ZERO    DAT 0
```

(a) What does the instruction BRZ NEXT do? [2]

(b) What addressing mode is used in this program? [1]

(c) Describe briefly the purpose of the program. [2]

[Total 50 marks]